Qfit™

Respirator Fit Testers

(Manual and Automatic Versions)

User's Manual

P/N 6002712, Revision C
December 2010

U.S. and International patents pending.

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WARNING

This instrument contains (1) rechargeable Nickel Metal Hydride (NiMH) battery which is not user serviceable.

Disclaimer: The measurement provided by the Qfit™ Respirator Fit Tester is an assessment of respirator fit during a fit test only. Respirator fit at other times will vary. The fit factor value is not intended for use in calculating an individual's actual exposure to hazardous substances.

Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at (800) 874-2811 (USA) or (001 651) 490-2811 (International) or visit www.tsi.com.

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Patents

U.S. and International patents pending.

Contents

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Introduction

The Qfit™ Respirator Fit Tester is developed based on OSHA 29CFR 1910.134, Respirator Fit Test Protocol to test the integrity of respirators to a specific individual wearer. The Qfit™ Respirator Fit Tester has two versions: Manual and Automatic. Both versions replace the need to repetitively hand aspirate the rubber squeeze bulb by using an integral pump to disperse the sensitivity and fit test solutions. The main difference between manual and automatic versions is that the manual version requires the users to control Qfit™ fit tester by pressing button manually to execute the fit test protocol, and the automatic version controls Qfit™ fit tester by built-in timing sequence automatically to execute the fit test protocol.

N o t e
Users should always follow the OSHA Respirator Standard 29CFR 1910.134, or the authority having jurisdiction to conduct a fit test. The fit test procedures summarized in this manual are the same as those recommended by OSHA except that the solutions are pre-mixed and the generation of the mist is automated from a powered pump rather than generated by repetitively squeezing the nebulizer bulb.

Handheld Operation

Both the manual and automatic Qfit™ Respirator Fit Testers can be operated under the handheld mode.

Figure 1. Handheld Operation

To operate in handheld mode:

1. Attach rechargeable battery to Qfit™ fit tester.
2. Attach cartridge with elbow (Figure 2).

Figure 2. Attach Cartridge with Elbow

3. Optional—Attach extension tube to elbow (Figure 3).

Figure 3. Attach Extension Tube to Elbow (*optional*)

4. Plug the cartridge and elbow into the top of the Qfit™ tester (Figure 4).

Figure 4. Plug Cartridge and Elbow into the Top of Qfit™ Tester

5. Run the Qfit™ fit tester.

Note
The Qfit™ battery should be used for handheld operation. **Never** use the AC power supply during handheld operation.

Remote Operation

Both manual and automatic Qfit™ Respirator Fit Testers can be operated under the remote mode. The Qfit™ fit tester Remote Accessory (TSI P/N 805015) is needed in order to run the Qfit™ fit tester under this mode.

Figure 5. Remote Operation

To operate in remote mode:

1. Remove rechargeable battery from Qfit™ fit tester (remote mode can only be run directly from the AC Adapter).
2. Plug Qfit™ fit tester AC power supply to the Qfit™ fit tester.

3. Plug Qfit™ fit tester remote connector into the Qfit™ fit tester air outlet (Figure 6).

Figure 6. Attach Air Outlet and Cartridge in Remote Operation

4. Plug the cartridge and elbow into the Qfit™ fit tester remote holder.
5. Optional—Attach extension tube to elbow.
6. Run the Qfit™ fit tester (Figure 7).

Correct—without Battery Attached

Incorrect—with Battery Attached

Figure 7. Run Qfit™ Fit Tester in Remote Operation

Notes
The tubing length is designed specifically for running in the remote mode. Do **not** cut or change remote tubing length or replace tubing. If you need new tubing, please call TSI customer service. The Qfit™ fit tester battery may **never** be used for remote mode operation. Always use the AC power supply by itself.

Reordering Supplies and Replacement Parts

Qty	Description	Model/ Part No.
8/box	Bitrex® Sensitivity Test Cartridge	805009
8/box	Bitrex ® Fit Test Multi-Cartridge	805010
8/box	Bitrex ® Fit Test Single Cartridge	805011
8/box	Saccharin Sensitivity Test Cartridge	805012
8/box	Saccharin Fit Test Multi-Cartridge	805013
8/box	Saccharin Fit Test Single Cartridge	805014
1	**Q**fit™ Fit Tester Hood	805005
1	**Q**fit™ Fit Tester Rechargeable Battery	805006
1	**Q**fit™ Fit Tester Elbow Assembly	805007
1	**Q**fit™ Fit Tester External Battery Charger	805018

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Instructions for Using Qfit™ Respirator Fit Tester in Qualitative Fit Testing (QLFT)—Manual Version

General Test Guidelines

The Qfit™ Respirator Fit Tester procedure is identical to OSHA 29CFR 1910.134 Respirator Fit Test Protocol. The difference is that a single 6-second activation of the QLFT nebulizer is equivalent to 5 squeezes when using the hand aspirated rubber squeeze bulb. Qfit™ fit tester replaces the need to repetitively hand aspirate the rubber squeeze bulb by using an integral pump.

The test subjects should ***not*** eat, drink, or chew gum for at least 15 minutes prior to testing since that can affect their taste perception. Water, however, is acceptable.

During all the sensitivity testing the test subject should breathe with mouth slightly open and tongue extended.

Always hold the Qfit™ Respirator Fit Tester upright and level as shown in Figure 8. The battery should be fully charged before beginning testing each day.

Correct Incorrect (left/right) Incorrect (forward/backward)

Figure 8. Correct and Incorrect Operation Positions

Equipment

- ☐ Test hood
- ☐ Face mask for the subject (user supplied)
- ☐ One Qfit™ manual nebulizer and elbow
- ☐ Optional extension tube
- ☐ Optional remote nebulizer head (deluxe kits only)
- ☐ One cartridge labeled Saccharin or Bitrex® (Denatonium benzoate) *Sensitivity*[*]
- ☐ One cartridge labeled Saccharin or Bitrex® (Denatonium benzoate) *Fit*[**]

Because of Saccharin's tendency to crystallize and block the aerosol output, a Saccharin Fit Test cartridge should be used within 2 hours of opening it.

Precautions

OSHA requires that a medical evaluation of the fit test subject be conducted prior to fit testing. Subjects need to be informed of the fit test ingredients used in the fit test solutions and that they will be exposed to a fine mist during the sensitivity and fit tests.

N o t e
Do **not** refill any sensitivity or fit test solution cartridges. Doing so could result in inaccurate fit test results.

® Bitrex is a registered trademark of Macfarlan Smith Ltd.

[*] A Sensitivity Test solution cartridge can be used for multiple test subjects. It can dispense aerosol for 16 sensitivity tests, depending upon the run time required per test subject.

[**] A Single Use Fit Test solution cartridge can be used for multiple test subjects. It can dispense aerosol for 1 to 3 fit tests, depending upon the run time required per test subject. A Multi-Use Fit Test solution cartridge can be used for multiple test subjects. It can dispense aerosol for 3 to 8 fit tests, depending upon the run time required per test subject.

Pump Operation

The manual version of the Qfit™ Respirator Fit Tester is outfitted with a manual timing control.

Charging the Battery

Note
When you first receive your new Qfit™ fit tester, the battery will need to be fully charged before use.

The Qfit™ fit tester battery should be recharged a minimum of 4 hours after 40 minutes (approximately 15 fit tests based on using protocol I) of actual pump runtime. With normal usage, this should be once per day. For high volume users, a second Qfit™ fit tester pump with battery is recommended. When the power in the battery becomes low, the yellow LED flashes to indicate that only a few minutes of battery power remains. You ***must*** recharge battery. During the charging operation, the yellow LED will light and automatically turn off after the battery is fully charged.

Figure 9. Charging Battery using the Power Supply

Removing/Replacing the Battery

1. To remove the battery from the Qfit™ fit tester, hold the upper portion of the Qfit™ fit tester, slide the battery (lower portion) sideways to disengage from the assembly (see Figure 10).
2. To replace the battery to the Qfit™ fit tester, while holding the upper portion, slide the battery sideways onto the Qfit™ fit tester.

Figure 10. Removing/Replacing Battery

For the Sensitivity Test

Press and hold down the Qfit™ test button for more than 1 second and then release the button, the pump will dispense the Sensitivity Solution for 6 seconds. The user is required to repeat as necessary to fulfill the timing protocols as shown in Table 1.

For the Fit Test

Press and hold down the Qfit™ test button for more than 1 second and then release the button, the pump will dispense the Test Solution for 6 seconds. The user is required to repeat as necessary to fulfill the timing protocols as shown in Table 2.

Sensitivity Test

1. The test subject should put on the hood but should **NOT** wear a mask during this test.
2. Pull the label off the Sensitivity cartridge and snap the elbow onto it. Place this in the Qfit™ Respirator Fit Tester.
3. Insert the nozzle into the hole in the front of the hood. Point it away from the subject's mouth and nose.
4. Push and hold the Qfit™ fit tester test button for **more than 1 second**, then release the button. The Qfit™ fit tester will now disperse 6 seconds of solution. Repeat for a total of 12 seconds of Qfit™ fit tester run time. Ask the subject if he/she can detect a sweet (or bitter) taste depending on the sensitivity solution used. If the taste is detected, then the sensitivity test is ended, use Timing Protocol I as shown in Table 1.
5. If a taste was not detected by the first aerosol dispersion, push and hold the Qfit™ fit tester test button for **more than 1 second**, then release the button. The Qfit™ fit tester will now disperse an additional 6 seconds of solution. Repeat for a total of 12 seconds of Qfit™ fit tester run time. Ask the subject if he/she can detect a sweet (or bitter) taste. If the taste is detected, then the sensitivity test is ended, use Timing Protocol II as shown in Table 1.
6. If a taste was not detected by the second aerosol dispersion, push and hold the Qfit™ fit tester test button for **more than 1 second**, then release the button. The Qfit™ fit tester will now disperse an additional 6 seconds of solution. Repeat for a total of 12 seconds of Qfit™ fit tester run time. Ask the subject if he/she can detect a sweet (or bitter) taste. If the taste is detected, then the sensitivity test is ended, use Timing Protocol III as shown in Table 1.

Table 1
Sensitivity Test Timing Protocols of Qfit™ Respirator Fit Tester

	Timing Protocol I	**Timing Protocol II**	**Timing Protocol III**
Number of 6-second activations during sensitivity threshold screening (without respirator)	2	4	6
Total pump run time (seconds) during sensitivity threshold screening (without respirator)	12	24	36

7. If all three aerosol dispersions did not elicit a sweet (or bitter) taste response, then the sensitivity test is ended. The subject cannot be tested with Saccharin or Bitrex® (Denatonium benzoate) and the other fit solution must be used or another type of qualitative or quantitative fit test must be performed.

Fit Test

1. The test subject should wear a respirator and any other equipment that is normally worn during use of the respirator and that might interfere with the fit, such as glasses or head gear.
2. Pull the label off the Fit Test cartridge and snap the elbow onto it. Place this in the Qfit™ Respirator Fit Tester.
3. Insert the nozzle into the hole in the front of the hood. Point it at the sealing surfaces of the respirator around the subject's face.
4. Push and hold the Qfit™ fit tester test button for **more than 1 second**, then release the button. The Qfit™ fit tester will now disperse 6 seconds of solution. Repeat as necessary to fulfill the fit test protocols based upon the sensitivity test as shown in Table 2. The Qfit™ fit tester nozzle must be inserted into the hood for all dispersions during the 7 minute test.

Table 2
Fit Test Timing Protocols of Qfit™ Respirator Fit Tester

	Timing Protocol I	Timing Protocol II	Timing Protocol III
Number of 6-second activations during initial Fit Test dispersions (with respirator)	2	4	6
Number of 6-second activations of fit test solution for each 30 seconds thereafter (with respirator)	1	2	3

5. The test subject should perform the following exercises during the 7 minute test. If at any point during the test the subject detects a sweet (or bitter) taste depending on the fit test solution used, then the fit test is over. The fit of the mask is not acceptable. However, if all 7 exercises are completed without detecting a sweet (or bitter) taste, then the mask fit passes.

6. In the case of a failed fit test, the mask can be refitted or a new mask chosen. The test begins again, starting with the Sensitivity test.

Halting the Qfit™ Respirator Fit Tester

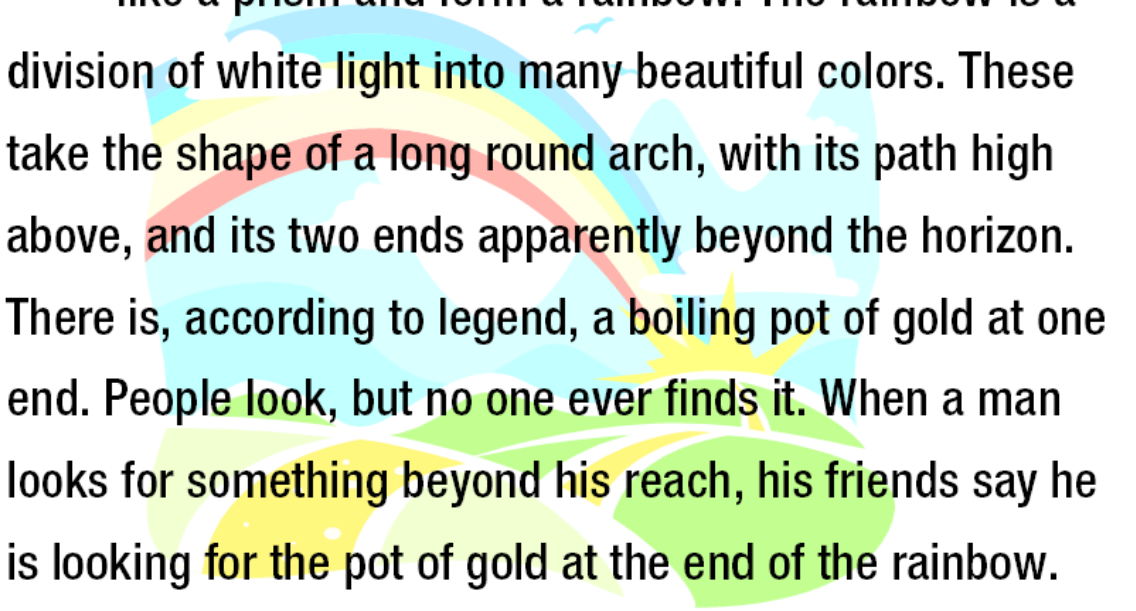
If at any point during the test the subject detects a sweet (or bitter) taste depending on the fit test solution used, then the fit test is over.

Fit Test Exercises

N o t e
Always follow the OSHA Respirator Standard 29CFR 1910.134, or the authority having jurisdiction. The fit test exercises have been summarized here for convenience.

- Minute 1: Breathe normally. Stand in a normal position and do not talk.
- Minute 2: Breathe deeply in a normal standing position, do not talk. Be careful not to hyperventilate.
- Minute 3: Turn head side to side. Turn head slowly enough to inhale once at the extreme on each side, do not talk.
- Minute 4: Move head up and down. Move slowly enough to inhale while looking up at the ceiling, do not talk.
- Minute 5: Talk out loud. For example, read the “Rainbow Passage” (Figure 11) below or count backwards from 100. Talk slowly and loud enough to be heard.
- Minute 6: Bending over or jog in place.
- Minute 7: Breathe normally, stand in a normal position, and do not talk.

Figure 11. Rainbow Passage



When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

Fairbanks, G. 1960 "Voice and Articulation Drill Book." Harper & Row, New York.

Rainbow Passage

Maintenance

The top of the Qfit™ fit tester should be inspected for spilled solution. With the cartridge removed, wipe any spilled or dried solution from around the pump air outlet.

The elbow should be rinsed out with warm tap water after a change of solution types or at the end of daily use.

Because of Saccharin's tendency to crystallize, store and operate Saccharin Fit cartridges in room temperatures greater than 65ºF.

Cartridges are made of polycarbonate and can be recycled.

Troubleshooting

Problem	Cause and Solution
The pump doesn't run when the Qfit™ fit tester test button is pushed.	1. Make sure rechargeable battery is attached to the Qfit™ fit tester. 2. Check that the battery is fully charged. 3. In order to activate the Qfit™ fit tester, push and hold the button for longer than 1 second and then release the button.
The battery is charged, but the battery low indicator is still on.	1. Plug the AC adapter in to charge the battery, please note that the yellow LED light will flash three times and stay on to indicate charging. A full battery charging takes about 4 hours. 2. Once the battery is fully charged, the yellow LED light should turn off.

Comparison of Number of Nebulizer Squeezes

Comparison of number of nebulizer squeezes per fit test using squeeze bulb and number of activations per Fit Test using Qfit™ fit tester with a sensitivity threshold of 10 squeezes.

	Number of Nebulizer Squeezes per Fit Test	Number of 6 second Activations using Manual Qfit™ Respirator Fit Tester
Threshold Test	10	2
Exercise – Normal Breathing	10	2
Interim 30s	5	1
Exercise 2 – Deep Breathing	5	1
Interim 30 s	5	1
Exercise 3 – Turn head side to side	5	1
Interim 30 s	5	1
Exercise 4 – Move head up and down	5	1
Interim 30 s	5	1
Exercise 5 – Talking out loud	5	1
Interim 30 s	5	1
Exercise 6 – Bend over or jog in place	5	1
Interim 30 s	5	1
Exercise 7 – Normal Breathing	5	1
Interim 30 s	5	1

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Instructions for Using Qfit™ Respirator Fit Tester in Qualitative Fit Testing (QLFT)—Automatic Version

General Test Guidelines

The Qfit™ Respirator Fit Test procedure is identical to OSHA 29CFR 1910.134 Respirator Fit Test Protocol. The difference is that a single 6-second activation of the QLFT nebulizer is equivalent to 5 squeezes when using the hand aspirated rubber squeeze bulb. Qfit™ fit tester replaces the need to repetitively hand aspirate the rubber squeeze bulb by using an integral pump.

The test subjects should not eat, drink, or chew gum for at least 15 minutes prior to testing since that can affect their taste perception. Water, however, is acceptable.

During all the sensitivity testing the test subject should breathe with mouth slightly open and tongue extended.

Always hold the Qfit™ Respirator Fit Tester upright and level as shown in Figure 12. The battery should be fully charged before beginning testing each day.

Correct | Incorrect (left/right) | Incorrect (forward/backward)

Figure 12. Correct and Incorrect Operation Positions

Equipment

- ☐ Test hood
- ☐ Face mask for the subject
- ☐ One Qfit™ automated nebulizer and elbow
- ☐ Optional extension tube
- ☐ Optional remote nebulizer head (deluxe kits only)
- ☐ One cartridge labeled Saccharin or Bitrex® (Denatonium benzoate) *Sensitivity*[*]
- ☐ One cartridge labeled Saccharin or Bitrex® (Denatonium benzoate) *Fit*[**]

Precautions

OSHA requires that a medical evaluation of the fit test subject be conducted prior to fit testing. Subjects need to be informed of the fit test ingredients used in the fit test solution and that they will be exposed to a fine mist during the sensitivity and fit tests.

N o t e
Do **not** refill any sensitivity or fit test solution cartridges. Doing so could result in inaccurate fit test results.

Pump Operation

The automated version of the Qfit™ Respirator Fit Tester is outfitted with an automated timing protocol. To access the timing protocol, press and hold down the Qfit™ fit tester test button until the yellow LED light turns on (1 second).

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[*] A Sensitivity Test solution cartridge can be used for multiple test subjects. It can dispense aerosol for 16 sensitivity tests, depending upon the run time required per test subject.

[**] A Single Use Fit Test solution cartridge can be used for multiple test subjects. It can dispense aerosol for 1 to 3 fit tests, depending upon the run time required per test subject. A Multi-Use Fit Test solution cartridge can be used for multiple test subjects. It can dispense aerosol for 3 to 8 fit tests, depending upon the run time required per test subject.

Charging the Battery

Note
When you first receive your new Qfit™ fit tester, the battery will need to be fully charged before use.

The Qfit™ fit tester battery should be recharged a minimum of 4 hours after 40 minutes (approximately 15 fit tests based on using protocol I) of actual pump runtime. With normal usage, this should be once per day. For high volume users, a second Qfit™ fit tester pump with battery is recommended. When the power in the battery becomes low, the yellow LED flashes to indicate that only a few minutes of battery power remains. You ***must*** recharge battery. During the charging operation, the yellow LED will light and automatically turn off after the battery is fully charged.

Figure 13. Charging Battery using the Power Supply

Removing/Replacing the Battery

1. To remove the battery from the Qfit™ fit tester, hold the upper portion of the Qfit™ fit tester, slide the battery (lower portion) sideways to disengage from the assembly (see Figure 14).
2. To replace the battery to the Qfit™ fit tester, while holding the upper portion, slide the battery sideways onto the Qfit™ fit tester.

Figure 14. Removing/Replacing Battery

For the Sensitivity Test

Push the button lighting the yellow LED, release the button and wait for the pump to dispense the sensitivity solution for 12 seconds.

For the Fit Test

Push the button lighting the yellow LED then quickly (within 3 seconds) push the Qfit™ fit tester test button again either 1, 2, or 3 times to activate the timing protocols in Table 5.

Note
To stop a test protocol at any time, push the Qfit™ fit tester test button once.

Sensitivity Test

1. The test subject should put on the hood but should **NOT** wear a mask during this test.
2. Pull the label off the Sensitivity cartridge and snap the elbow onto it. Place this in the Qfit™ Respirator Fit Tester.
3. Insert the nozzle into the hole in the front of the hood. Point it away from the subject's mouth and nose.
4. Push and hold the Qfit™ fit tester test button until the yellow LED light turns on and then release the button. The Qfit™ fit tester will now disperse solution for 12 seconds. Ask the subject if he/she can detect a sweet (or bitter) taste. If the taste is detected, then the sensitivity test is ended, use Timing Protocol I as shown in Table 3.
5. If a taste was not detected by the first aerosol dispersion, push and hold the Qfit™ fit tester test button until the yellow LED light turns on and then release the button. The Qfit™ fit tester will now disperse solution for an additional 12 seconds. Ask the subject if he/she can detect a sweet (or bitter) taste depending on the sensitivity solution used. If the taste is detected, then the sensitivity test is ended, use Timing Protocol II as shown in Table 3.
6. If a taste was not detected by the second aerosol dispersion, push and hold the Qfit™ fit tester test button until the yellow LED light turns on and then release the button. The Qfit™ fit tester will now disperse solution for an additional 12 seconds. Ask the subject if he/she can detect a sweet (or bitter) taste. If the taste is detected, then the sensitivity test is ended, use Timing Protocol III as shown in Table 3.

Table 3
Sensitivity Test Timing Protocols of Qfit™ Respirator Fit Tester

	Timing Protocol I	Timing Protocol II	Timing Protocol III
Number of 12 second activations during sensitivity threshold screening (without respirator)	1	2	3
Total pump run time (seconds) during sensitivity threshold screening (without respirator)	12	24	36

7. If all three aerosol dispersions did not elicit a sweet (or bitter) taste response, then the sensitivity test is ended. The subject cannot be tested with Saccharin or Bitrex® (Denatonium benzoate) and the other fit solution must be used or another type of qualitative or quantitative fit test must be performed.

Fit Test

1. The test subject should wear a respirator and any other equipment that is normally worn during use of the respirator and that might interfere with the fit, such as glasses or head gear.

2. Pull the label off the Fit Test cartridge and snap the elbow onto it. Place this in the Qfit™ Respirator Fit Tester.
3. Insert the nozzle into the hole in the front of the hood. Point it at the sealing surfaces of the respirator around the subject's face.
4. Push and hold the Qfit™ fit tester test button until the yellow LED light turns on. Push the Qfit™ fit tester test button based on the desired Timing Protocol that you noted during the Sensitivity test before 4 seconds have elapsed to initiate one of the three automatic fit test protocols from Table 4. The Qfit™ fit tester will

automatically dispense the amount of aerosol appropriate for QLFT Protocol I, II, or III, based on the Sensitivity test results. During the first minute there will be an initial dispersion of aerosol and then again every 30 seconds there will be a subsequent dispersion. The Qfit™ fit tester nozzle must be inserted into the hood for all dispersions during the 7 minute test.

Table 4

Number of Button Pushes for Activations of Qfit™ Respirator Fit Tester

	Timing Protocol I	**Timing Protocol II**	**Timing Protocol III**
Number of button pushes (press quickly) to activate automatic Fit Test	1	2	3

Table 5

Fit Test Timing Protocols of Qfit™ Respirator Fit Tester

	Timing Protocol I	**Timing Protocol II**	**Timing Protocol III**
Number of 12-second activations during initial Fit Test dispersions (with respirator)	1	2	3
Number of 6-second activations of fit test solution for each 30 seconds thereafter (with respirator)	1	2	3

5. The test subject should perform the following exercises during the 7 minute test. If at any point during the test the subject detects a sweet (or bitter) taste depending on the fit test solution used, then the fit test is over. The fit of the mask is not acceptable. However, if all 7 exercises are completed without detecting a sweet (or bitter) test, then the mask fit passes.
6. In the case of a failed fit test, the mask can be refitted or a new mask chosen. The test begins again, starting with the Sensitivity test.

Halting the Qfit™ Respirator Fit Tester

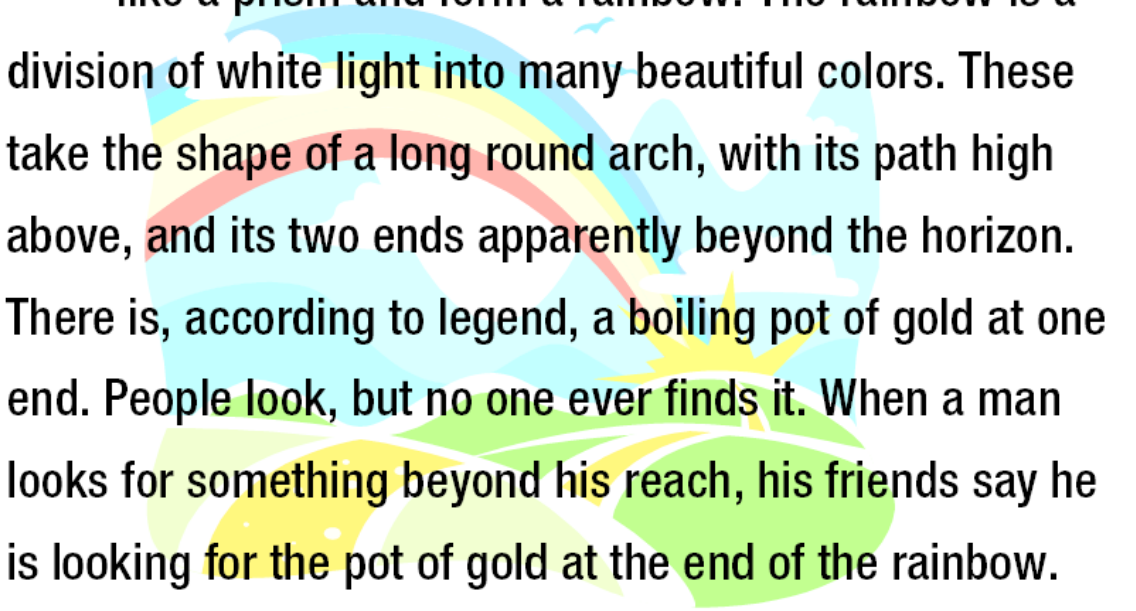
If at any point during the test the subject detects a sweet (or bitter) taste depending on the fit test solution used, then the fit test is over. The Qfit™ Respirator Fit Tester timing protocol can be cleared by pushing the test button once.

Fit Test Exercises

N o t e
Always follow the OSHA Respirator Standard 29CFR 1910.134, or the authority having jurisdiction. The fit test exercises have been summarized here for convenience.

- Minute 1: Breathe normally. Stand in a normal position and do not talk.
- Minute 2: Breathe deeply in a normal standing position, do not talk. Be careful not to hyperventilate.
- Minute 3: Turn head side to side. Turn head slowly enough to inhale once at the extreme on each side, do not talk.
- Minute 4: Move head up and down. Move slowly enough to inhale while looking up at the ceiling, do not talk.
- Minute 5: Talk out loud. For example, read the “Rainbow Passage” (Figure 15) below or count backwards from 100. Talk slowly and loud enough to be heard.
- Minute 6: Bending over or jog in place.
- Minute 7: Breathe normally, stand in a normal position, and do not talk.

Figure 15. Rainbow Passage



Fairbanks, G. 1960 "Voice and Articulation Drill Book." Harper & Row, New York.

Rainbow Passage

Maintenance

The top of the Qfit™ fit tester should be inspected for spilled solution. With the cartridge removed, wipe any spilled or dried solution from around the pump air outlet.

The elbow should be rinsed out with warm tap water after a change of solution types or at the end of daily use.

Because of Saccharin's tendency to crystallize, store and operate Saccharin Fit cartridges in room temperatures greater than 65ºF.

Cartridges are made of polycarbonate and can be recycled.

Troubleshooting

Problem	Cause and Solution
The pump doesn't run when the Qfit™ fit tester test button is pushed.	1. Make sure rechargeable battery is attached to the Qfit™ fit tester. 2. Check that the battery is fully charged. 3. In order to activate the Qfit™ fit tester, push and hold the button until the yellow LED light turns on and then push the button 1, 2, or 3 times based on sensitivity level.
The battery is charged, but the battery low indicator is still on.	1. Plug the AC adapter in to charge the battery, please note that the yellow LED light will flash three times and stay on to indicate charging. A full battery charging takes about 4 hours. 2. Once the battery is fully charged, yellow LED light should turn off.

Comparison of Number of Nebulizer Squeezes

Comparison of number of nebulizer squeezes per fit test using squeeze bulb and number of activations per fit test using Qfit™ fit tester with a sensitivity threshold of 10 squeezes.

	Number of Nebulizer Squeezes per Fit Test	Number of 6 second Activations using Automatic Qfit™ Respirator Fit Tester
Threshold Test	10	2
Exercise – Normal Breathing	10	2
Interim 30s	5	1
Exercise 2 – Deep Breathing	5	1
Interim 30 s	5	1
Exercise 3 – Turn head side to side	5	1
Interim 30 s	5	1
Exercise 4 – Move head up and down	5	1
Interim 30 s	5	1
Exercise 5 – Talking out loud	5	1
Interim 30 s	5	1
Exercise 6 – Bend over or jog in place	5	1
Interim 30 s	5	1
Exercise 7 – Normal Breathing	5	1
Interim 30 s	5	1

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Qfit™ Respirator Fit Tester Service Procedure

The pump and battery pack for your Qfit™ Respirator Fit Tester are covered by a 1 year manufacturer's warranty.

1. If your Qfit™ Respirator Fit Tester is not operating properly, contact TSI Customer Service at 1-800-874-2811 (USA) or 01 (651) 490-2811 (Internationally).
2. TSI Customer Service will ask you for the Serial Number of your Qfit™ fit tester found on the bar code sticker on the top of the pump nebulizer. Also, you will be asked for the nature of the operational problem in order to troubleshoot your issue.

Service and Support

If you have difficulty setting up or operating the Qfit™ Respirator Fit Tester, or if you have technical or application questions, contact TSI Customer Service at:

TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126 USA
Phone: 1-800-874-2811 (USA) or 001 (651) 490-2811
E-mail: technical.service@tsi.com

International Contacts

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TSI Instruments Ltd.
Stirling Road
Cressex Business Park
High Wycombe, Bucks
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Material Safety Data Sheets

TSI INC.
BITREX® SOLUTIONS
SENSITIVITY AND FIT TEST

MATERIAL SAFETY DATA SHEET

1. Product And Company Identification

PRODUCT NAME: Bitrex Solutions, Sensitivity and Fit Test

MANUFACTURER:
TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126

INFORMATION PHONE NUMBER: (651) 490-2811 TOLL FREE: (800) 874-2811
FAX NUMBER: (651) 490-3824
EMAIL: answers@tsi.com
MSDS DATE OF PREPARATION/REVISION: 08/28/09

PRODUCT USE: Solution used in respirator fit tests

2. Hazards Identification

Clear, colorless solution with no odor. Extreme bitter taste.

EMERGENCY OVERVIEW

May cause mild eye irritation. Extremely bitter taste. May be harmful if swallowed.

3. Composition/Information On Ingredients

Component	CAS No.	Amount
Bitrex® Anhydrous	3734-33-6	<1%
Water	7732-18-5	>99%

(See Section 8 for Exposure Limits)

4. First Aid Measures

INHALATION: Move to fresh air. Seek medical advice if cough, shortness of breath, or other respiratory problems occur.

SKIN CONTACT: Rinse thoroughly with water. Seek medical advice if redness, swelling, itching, or burning occurs.

EYE CONTACT: Rinse immediately with plenty of water for 15 minutes, also under the eyelids. Obtain medical attention if irritation persists.

INGESTION: Ingestion of large amounts is unlikely due to the extremely bitter taste. However, if large amounts are ingested, call a physician or Poison Control Center immediately. If victim is conscious, rinse mouth with a small amount of water. Never give anything by mouth to a person who is drowsy or unconscious.

® Bitrex is a registered trademark of Macfarlan Smith Ltd.

5. Firefighting Measures

EXTINGUISHING MEDIA: Use media suitable for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

UNUSUAL FIRE HAZARDS: None known.

HAZARDOUS COMBUSTION PRODUCTS: None known.

6: Accidental Release Measures

Contain and collect with inert absorbent material and place in a suitable container for disposal.

7. Handling and Storage

Avoid contact with the eyes. No special storage conditions required.

8. Exposure Controls / Personal Protection

EXPOSURE LIMITS

CHEMICAL	EXPOSURE LIMIT
Bitrex®	None Established
Water	None Established

VENTILATION: None needed under normal use conditions.

RESPIRATORY PROTECTION: None under normal use conditions.

GLOVES: None under normal use conditions.

EYE PROTECTION: Safety glasses or goggles recommended.

9. Physical and Chemical Properties

APPEARANCE AND ODOR: Clear, colorless liquid with no odor. Extremely bitter taste.

pH: Not determined	SPECIFIC GRAVITY: ~1
BOILING POINT: ~100°C (212°F) (same as water)	VAPOR PRESSURE: Same as water
FREEZING POINT: Not determined	VAPOR DENSITY: Same as water
SOLUBILITY IN WATER: Complete	PERCENT VOLATILE: >99%
VISCOSITY: Not determined	EVAPORATION RATE: Same as water
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not determined	
FLASH POINT: None	AUTOIGNITION TEMP: None
FLAMMABILITY LIMITS: LEL: None UEL: None	

10. Stability and Reactivity

STABILITY: Stable
CONDITIONS TO AVOID: None currently known.
INCOMPATIBILITY: None known.
HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition will produce oxides of carbon and nitrogen.
HAZARDOUS POLYMERIZATION: Will not occur.

11. Toxicological Information

POTENTIAL HEALTH EFFECTS:

ACUTE HAZARDS:
INHALATION: Inhalation of aerosol may cause upper respiratory tract irritation.

SKIN CONTACT: Prolonged skin contact may cause mild irritation.

EYE CONTACT: May cause mild eye irritation.

INGESTION: May cause nausea, vomiting, diarrhea, dizziness, drowsiness, and other symptoms of central nervous system depression. The material has a profoundly bitter taste, so ingestion of large amounts is very unlikely.

CHRONIC HAZARDS: None expected.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

CARCINOGEN: None of the components of this product are listed as carcinogens by OSHA, IARC, NTP or ACGIH.

Acute Toxicity Values:
Bitrex®: Oral rat LD50: 584 mg/kg

12. Ecological Information

No ecotoxicity data is available for this product or its components at this time.

13. Disposal Considerations

Recycle, incinerate or landfill in accordance with all local, state/provincial and federal regulations.

14. Transport Information

Not regulated for transport by DOT, IATA, or IMDG.

15. Regulatory Information

EPA SARA 311/312 HAZARD CLASSIFICATION: Not hazardous

EPA SARA 313: This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372):

Chemical Name	CAS #	Weight %
None		

CERCLA SECTION 103: This product is not subject to CERCLA reporting requirements. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

EPA TSCA INVENTORY: All of the components of this material are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

CALIFORNIA PROPOSITION 65: This product contains the following substances known to the State of California to cause cancer, birth defects or other reproductive harm: None.

INTERNATIONAL INVENTORIES:

CANADIAN ENVIRONMENTAL PROTECTION ACT: All of the ingredients are listed on the Canadian Domestic Substances List.

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS): All of the ingredients are listed on the EINECS inventory.

AUSTRALIA: All of the ingredients of this product are listed on the Australian Inventory of Chemical Substances

JAPAN: All of the ingredients of this product are listed on the Japanese Existing and New Chemical Substances (MITI) List.

KOREA: All of the ingredients of this product are listed on the Korean Existing Chemicals List (KECL).

CHINA: All of the ingredients of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC).

PHILIPPINES: All of the ingredients of this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS).

NEW ZEALAND: All of the ingredients of this product are listed on the Hazardous Substances and New Organisms (HSNO) List.

16. Other Information

NFPA Rating: Fire: 0 Health: 0 Reactivity: 0

REVISION SUMMARY: New MSDS.
While TSI Inc. believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of tests conducted, the data are not to be taken as a warranty or representation for which Prestone Products Corporation assumes legal responsibility. They are offered for your consideration, investigation and verification. Any use of these data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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Germany	**Tel:** +49 241 523030	**E-mail:** tsigmbh@tsi.com	**Website:** www.tsiinc.de

Contact TSI or visit our website **www.tsi.com** for more detailed specifications.

P/N 6003028 Rev. A

MATERIAL SAFETY DATA SHEET

1. Product And Company Identification

PRODUCT NAME: Saccharin Solutions, Sensitivity and Fit Test

MANUFACTURER:
TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126

INFORMATION PHONE NUMBER: (651) 490-2811 TOLL FREE: (800) 874-2811
FAX NUMBER: (651) 490-3824
EMAIL: answers@tsi.com
MSDS DATE OF PREPARATION/REVISION: 08/28/09

PRODUCT USE: Solution used in respirator fit tests

2. Hazards Identification

Clear, colorless solution with no odor. Sweet taste.

EMERGENCY OVERVIEW

May cause mild eye irritation. Extremely sweet taste.

3. Composition/Information On Ingredients

Component	CAS No.	Amount
Sodium Saccharin	82385-42-0	<1 to 50%
Water	7732-18-5	>50%

(See Section 8 for Exposure Limits)

4. First Aid Measures

INHALATION: Move to fresh air. Seek medical advice if cough, shortness of breath, or other respiratory problems occur.

SKIN CONTACT: Rinse thoroughly with water. Seek medical advice if redness, swelling, itching, or burning occurs.

EYE CONTACT: Rinse immediately with plenty of water, also under the eyelids. Obtain medical attention if irritation persists.

INGESTION: No first aid should be needed. Seek advice of medical personnel if gastrointestinal symptoms occur.

5. Firefighting Measures

EXTINGUISHING MEDIA: Use media suitable for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

UNUSUAL FIRE HAZARDS: None known.

HAZARDOUS COMBUSTION PRODUCTS: None known.

6: Accidental Release Measures

Contain and collect with inert absorbent material and place in a suitable container for disposal.

7. Handling and Storage

Avoid contact with the eyes. No special storage conditions required.

8. Exposure Controls / Personal Protection

EXPOSURE LIMITS

CHEMICAL	EXPOSURE LIMIT
Sodium Saccharin	None Established
Water	None Established

VENTILATION: None needed under normal use conditions.

RESPIRATORY PROTECTION: None under normal use conditions.

GLOVES: None under normal use conditions.

EYE PROTECTION: Safety glasses or goggles recommended.

9. Physical and Chemical Properties

APPEARANCE AND ODOR: Clear, colorless liquid with no odor. Extremely sweet taste.

pH: Not determined	SPECIFIC GRAVITY: Not determined
BOILING POINT: Not determined	VAPOR PRESSURE: Same as water
FREEZING POINT: Not determined	VAPOR DENSITY: Same as water
SOLUBILITY IN WATER: Complete	PERCENT VOLATILE: >50%
VISCOSITY: Not determined	EVAPORATION RATE: Not determined
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not determined	
FLASH POINT: None	AUTOIGNITION TEMP: None
FLAMMABILITY LIMITS: LEL: None UEL: None	

10. Stability and Reactivity

STABILITY: Stable
CONDITIONS TO AVOID: None currently known.
INCOMPATIBILITY: None known.
HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition will produce oxides of carbon, sulfur, and nitrogen.
HAZARDOUS POLYMERIZATION: Will not occur.

11. Toxicological Information

POTENTIAL HEALTH EFFECTS:

ACUTE HAZARDS:
INHALATION: Inhalation of aerosol may cause upper respiratory tract irritation.

SKIN CONTACT: Prolonged skin contact may cause mild irritation.

EYE CONTACT: May cause mild eye irritation.

INGESTION: Not intended for ingestion. However, no unusual hazards are expected.

CHRONIC HAZARDS: None expected.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

CARCINOGEN: None of the components of this product are listed as carcinogens by OSHA, IARC, NTP or ACGIH.

Acute Toxicity Values:
Sodium Saccharin: Oral rat LD50: 14,200 mg/kg

12. Ecological Information

No ecotoxicity data is available for this product or its components at this time.

13. Disposal Considerations

Recycle, incinerate or landfill in accordance with all local, state/provincial and federal regulations.

14. Transport Information

Not regulated for transport by DOT, IATA, or IMDG.

15. Regulatory Information

EPA SARA 311/312 HAZARD CLASSIFICATION: Not hazardous

EPA SARA 313: This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372):

Chemical Name	CAS #	Weight %
None		

CERCLA SECTION 103: This product is not subject to CERCLA reporting requirements. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

EPA TSCA INVENTORY: All of the components of this material are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

CALIFORNIA PROPOSITION 65: This product contains the following substances known to the State of California to cause cancer, birth defects or other reproductive harm: None.

INTERNATIONAL INVENTORIES:

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NEW ZEALAND: All of the ingredients of this product are listed on the Hazardous Substances and New Organisms (HSNO) List.

16. Other Information

NFPA Rating: Fire: 0 Health: 0 Reactivity: 0

REVISION SUMMARY: New MSDS.
While TSI Inc. believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of tests conducted, the data are not to be taken as a warranty or representation for which Prestone Products Corporation assumes legal responsibility. They are offered for your consideration, investigation and verification. Any use of these data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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